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10 CFR 50.55a

July 20, 2022

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Response to Request for Additional Information
Requests for Relief from American Society of Mechanical Engineers
Section XI Volumetric Examination Requirements –
Fourth 10-Year Interval, Second and Third Periods

Arkansas Nuclear One, Unit 2
NRC Docket Nos. 50-368
Renewed Facility Operating License No. NPF-6

Entergy Operations, Inc., (Entergy) requested relief in accordance with 10 CFR 50.55a(g)(5)(iii) from certain requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI via Reference 1. Specifically, relief requests ANO2-ISI-023, ANO2-ISI-024, ANO2-ISI-025, ANO2-ISI-026, ANO2-ISI-027, and ANO2-ISI-028 pertain to the examination coverage of Class 1 and 2 vessel welds and Class 1 and 2 piping welds in the second and third periods of the fourth 10-year inservice inspection (ISI) interval for Arkansas Nuclear One, Unit 2 (ANO-2).

The NRC staff has reviewed the subject relief requests and determined that additional information was required (Reference 2) to complete its review of the application.

The Requests for Additional Information (RAIs) and the associated responses are provided in the Enclosure.

There are no regulatory commitments established in this submittal.

If there are any questions or if additional information is needed, please contact Riley Keele, Manager, Regulatory Assurance, Arkansas Nuclear One, at 479-858-7826.

Respectfully,



Phil Couture

PC/rwc

Enclosure: Response to Request for Additional Information

- References:
1. Entergy Operations, Inc. (Entergy) letter to the U. S. Nuclear Regulatory Commission (NRC), "Requests for Relief from American Society of Mechanical Engineers Section XI Volumetric Examination Requirements – Fourth 10-Year Interval, Second and Third Periods," (2CAN022202) (ML22055B120), dated February 24, 2022
 2. NRC email to Riley Keele (Entergy), "ANO-2 Final RAI RE: Relief Requests ANO2-ISI-023 through -028 (EPIDs L-2022-LLR-0022 through -0027)," (2CNA062201), (ML22174A136), dated June 23, 2022

cc: NRC Region IV Regional Administrator
 NRC Senior Resident Inspector – Arkansas Nuclear One
 NRC Project Manager – Arkansas Nuclear One

ENCLOSURE

2CAN072201

**RESPONSE TO REQUEST FOR
ADDITIONAL INFORMATION**

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

By Reference 1, Entergy Operations, Inc., (Entergy) requested relief in accordance with 10 CFR 50.55a(g)(5)(iii) from certain requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI. Specifically, relief requests ANO2-ISI-023, ANO2-ISI-024, ANO2-ISI-025, ANO2-ISI-026, ANO2-ISI-027, and ANO2-ISI-028 pertain to the examination coverage of Class 1 and 2 vessel welds and Class 1 and 2 piping welds in the fourth 10-year inservice inspection (ISI) interval for Arkansas Nuclear One, Unit 2 (ANO-2).

The NRC staff has reviewed the subject relief requests and determined that additional information was required (Reference 2) to complete its review of the application.

Below are the Requests for Additional Information (RAIs) and the associated responses.

RAI-1

The cover letter of the submittal references the regulation in 10 CFR 50.55a(z)(2) to request a relief under impracticability. In addition, Section II of ANO2-ISI-023 references the regulations in 10 CFR 50.55a(g)(6)(iii) and Section II of ANO2-ISI-024, ANO2-ISI-025, ANO2-ISI-026, ANO2-ISI-027, and ANO2-ISI-028 reference the regulations in 10 CFR 50.55a(g)(6)(i).

However, the provisions for requesting relief for limited examination coverage are specified in 10 CFR 50.55a(g)(5)(iii), "ISI program update: Notification of impractical ISI Code requirements." Confirm which provision of 10 CFR 50.55a is being cited for this request.

Entergy's Response

These requests were intended to be submitted in accordance with the provisions of 10 CFR 50.55a(g)(5)(iii), "ISI program update: Notification of impractical ISI Code requirements."

RAI-2

In the submittal, the licensee states, in part,

The [ANO-2 fourth 10-year ISI] interval started on March 26, 2010, and ended on August 1, 2020. The second period started on March 26, 2013, and ended March 25, 2017. The third period started March 26, 2017, and ended August 1, 2020. The interval was extended to end March 25, 2021.

However, the NRC staff notes that in Reference 1 of the submittal (i.e., letter dated December 1, 2016 (ML16337A368)), the licensee stated that the fourth 10-year ISI interval started on March 26, 2010, and is scheduled to end on March 25, 2020. This appears to conflict with the completion dates of the fourth 10-year ISI interval identified in the cover letter to the application dated February 24, 2022 (i.e., March 25, 2020, August 1, 2020, and March 25, 2021). Confirm the start and completion dates for the fourth 10-year ISI interval at ANO-2.

Entergy's Response

In Reference 1 of the original relief request (ML16337A368) Entergy's request included a note associated with the end of the fourth ISI interval. The note reads:

These are the presently scheduled ISI interval end dates for ANO-2 and IP-3. However, adjustments to these dates could be made as allowed by IWA-2430 of ASME Section XI.

In March 2020, the ANO-2 fourth 10-year interval was extended to August 1, 2020, in accordance with IWA-2430. The interval was extended a second time to use the entire one-year extension as allowed by IWA-2430. The interval was completed on March 25, 2021.

The start and completions dates for the fourth 10-year ISI interval provided in Reference 1 are correct.

RAI-3

In ANO2-ISI-023, the licensee did not provide any discussion on procedure demonstration and personnel qualification for the ultrasonic testing (UT) performed on Examination Category B-D components in Table 1 of ANO2-ISI-023. Discuss whether the licensee utilized ASME Code, Section XI, Appendix VIII or ASME Code, Section V, as required by Appendix I of ASME Code, Section XI.

Entergy's Response

Procedures

Items that were examined with non-Appendix VIII techniques include the B-D / B3.110, B3.130 and B3.140 components as follows (Components IDs from Table 1 of ANO2-ISI-023):

- 05-009,
- 03-005,
- 03-006,
- 04-005,
- 04-006,
- 04-007,
- 04-005IR, and
- 04-006IR

Entergy procedures CEP-NDE-0497 "Manual Ultrasonic Examination of Welds in Vessels (Non-App. VIII)" and CEP-NDE-0485 "Manual Ultrasonic Examination of Vessel Nozzle Inside Radius (Non-App. VIII)" were used for the above-mentioned components respectively.

Procedure CEP-NDE-0497 was written in accordance with the applicable requirements of ASME Code, Section V - 2007 Edition through 2008 Addenda.

In accordance with the site ISI Programs, examination of nozzle inner radii on vessels other than the reactor vessel are required to be performed in accordance with the 2007 Edition, with 2008 Addenda of ASME Section XI. IWA-2232 of the Code would require that the examination be performed in accordance with ASME Section V, Article 4. However, Section V, Article 4 does not provide appropriate direction for examination of an inner radius. Section XI has developed specific rules for inner radius examination; however, these rules are currently limited to Reactor Vessels and are part of the ASME Section XI Appendix VIII initiative. ASME has recognized the Electric Power Research Institute (EPRI) led Performance Demonstration Initiative (PDI) as the industry platform for meeting the requirements of ASME Section XI Appendix VIII (including inner radius examinations of Reactor Vessel nozzles).

The requirements for volumetric examination of Pressurizer and Steam Generator (primary side) nozzle inner radii were removed from table IWB-2500-1 of the 2007 Edition, with 2008 Addenda of ASME Section XI. However, 10 CFR 50.55a(b)(2)(xxi)(A) specifies that the 1998 Edition must be applied when the 1999 Addenda through the latest edition and addenda of ASME Section XI is the site's current code of record. Therefore, Pressurizer and Steam Generator (primary side) nozzle inner radii examinations are required to be performed in accordance with the 1998 Editions of ASME Section V, Article 4 and ASME Section XI.

IWA-2240 of ASME Code, Section XI, allows for alternative examination methods, a combination of methods, or newly developed techniques to be substituted for the methods specified in the Code provided the Inspector is satisfied that the results are demonstrated to be equivalent or superior to those of the specified method. Under the provisions of IWA-2240, Entergy elected to upgrade the examination of nozzle inner radii of non-Reactor Vessel nozzles by using the guidance of the PDI and ASME Section XI Appendix VIII. Guidance from the latest revision of PDI-UT-11, "PDI Generic Procedure for the Ultrasonic Detection and Sizing of Reactor Pressure Vessel Nozzle to Shell Welds and Nozzle Inner Radius" was used during the writing of Procedure CEP-NDE-0485. The characteristics incorporated into this procedure from the PDI initiative will result in a superior examination compared to the examinations that would be provided by following the requirements of ASME Section V, Article 4

Items that were examined with Appendix VIII techniques include the B-D / B3.90 components (Components IDs from Table 1 of ANO2-ISI-023):

- 01-021 and
- 01-024

WesDyne's procedure WDI-STD-005 – PDI-ISI-254-NZ "Remote Inservice Inspection of Reactor Vessel Nozzle to Shell Welds" was utilized for both B3.90 components. The methodologies described in this procedure are intended to satisfy the volumetric examination requirements of ASME, Section XI, up to and including the latest approved Edition as per the latest issue of 10 CFR 50.55a

Qualifications

Entergy's procedures establish the requirements for training, qualification, examination, and certification of ASME Section XI UT Examination personnel in accordance with ANSI/ASNT CP-189 as modified by ASME Section XI, IWA-2300 and Appendix VII. This procedure is applicable only to personnel performing examinations in accordance with ASME Section XI.

RAI-4

Given the reduced coverage obtained for the subject welds, discuss whether a system leakage test was performed in accordance with the ASME Code, Section XI, IWB-5220 during each refueling outage in the fourth 10-year ISI interval. If leakage tests were performed, provide the results of the testing.

Entergy's Response

The following ANO-2 refueling outages occurred during the fourth 10-year interval.

Refueling Outage	Completion Date
2R21	March 26, 2011
2R22	October 10, 2012
2R23	June 12, 2014
2R24	November 14, 2015
2R25	July 8, 2017
2R26	November 21, 2018
2R27	April 21, 2020

A post-outage system pressure test was performed after the Reactor Coolant System (RCS) reached a temperature greater than 500 °F and 2155 pounds per square inch – absolute (psia) after each refueling outage listed above.

The results for all these pressure tests were acceptable except one. Details of this one exception is provided below:

During the 2R21 Post Outage Pressure Test, boric acid residue was observed under the reactor vessel. None of boric acid appeared to be active. White boric acid was observed on the exterior surface of the insulation and support frame under the vessel and on the walls, floor, supports and conduit under the vessel. Light rust corrosion was present on the support frame and rust corrosion was present on the conduit and supports under the vessel.

A review of this condition by the Boric Acid Coordinator determined that:

In comparing photographs taken in previous outages to those taken during 2R21 shows there has been no changes in the condition of this component. The dry boron is historical leakage that has been noted during walkdowns underneath the reactor vessel. There is no wet leakage and no additional boron. This boron is dry and mostly white with some surface rusting of structural steel, baseplates, and associated bolting. There does not appear to be any wall loss on any SSC just rusting of unpainted surfaces. This dry boron does not affect the ability of any SSC underneath the vessel to perform its intended function.

REFERENCES

1. Entergy Operations, Inc. (Entergy) letter to the U. S. Nuclear Regulatory Commission (NRC), "Requests for Relief from American Society of Mechanical Engineers Section XI Volumetric Examination Requirements – Fourth 10-Year Interval, Second and Third Periods," (2CAN022202) (ML22055B120), dated February 24, 2022
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